WHAT IS CLAIMED IS:

1. A method for generating a preamble sequence in an orthogonal frequency division multiplexing (OFDM) communication system having m subcarriers in a frequency domain, comprising the steps of:

grouping the m subcarriers by n subcarriers, where n is less than m, so as to generate p subchannels; and

assigning null data to subcarriers except the n subcarriers assigned to the subchannels, assigning data of a given sequence to at least one subchannel selected from the p subchannels, assigning null data to subchannels not selected from the p subchannels, and thereafter performing inverse fast Fourier transform (IFFT) for transforming the data into time-domain data.

2. The method of claim 1, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #1 which is a first subchannel among the 4 subchannels, then the given sequence is P111subch(-100:100) given by

P111subch(-100:100)={

-1 0 +1 0 +1 0 -1 0 -1 0 -1 0	[-100:-89] subch#1
0 0 0 0 0 0 0 0 0 0 0 0 0	[- 88:-76] subch#2
0 0 0 0 0 0 0 0 0 0 0 0	[- 75:-64] subch#3
0 0 0 0 0 0 0 0 0 0 0 0 0	[- 63:-51] subch#4
+1 0 +1 0 +1 0 -1 0 +1 0 -1 0	[- 50:-39] subch#1
0 0 0 0 0 0 0 0 0 0 0 0 0	[- 38:-26] subch#2
0 0 0 0 0 0 0 0 0 0 0 0	[- 25:-14] subch#3
0 0 0 0 0 0 0 0 0 0 0 0 0	[- 13:- 1] subch#4
0	[DC]

```
        0 +1 0 -1 0 +1 0 +1 0 -1 0 -1 0          [  1: 13] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0                [ 14: 25] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0 0              [ 26: 38] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0                [ 39: 50] subch#4
        0 -1 0 -1 0 -1 0 -1 0 +1 0 -1 0          [ 51: 63] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0                  [ 64: 75] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0 0              [ 76: 88] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0                [ 89:100] subch#4
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

3. The method of claim 1, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #1 which is a first subchannel among the 4 subchannels, then the given sequence is P211subch(-100:100) given by

```
P211subch(-100:100)={
        0 0 0 0 0 0 0 0 0 0 0 0 0                [-100:-89] subch#3
        -1 0 +1 0 +1 0 -1 0 -1 0 -1 0 -1         [- 88:-76] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0                [- 75:-64] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 63:-51] subch#2
        +1 0 -1 0 -1 0 +1 0 -1 0 -1 0            [- 50:-39] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 38:-26] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0                [- 25:-14] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 13:- 1] subch#4
        0                                        [DC]
```

```
 0 +1 0 -1 0 +1 0 -1 0 +1 0 -1 0        [  1: 13] subch#1
 0 0 0 0 0 0 0 0 0 0 0 0 0              [ 14: 25] subch#3
 0 0 0 0 0 0 0 0 0 0 0 0 0 0            [ 26: 38] subch#2
 0 0 0 0 0 0 0 0 0 0 0 0                [ 39: 50] subch#4
 0 0 0 0 0 0 0 0 0 0 0 0 0              [ 51: 63] subch#3
-1 0 -1 0 +1 0 +1 0 +1 0 +1 0           [ 64: 75] subch#1
 0 0 0 0 0 0 0 0 0 0 0 0 0              [ 76: 88] subch#4
 0 0 0 0 0 0 0 0 0 0 0 0                [ 89:100] subch#2
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

4. The method of claim 1, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #2 which is a second subchannel among the 4 subchannels, then the given sequence is P112subch(-100:100) given by

```
P112subch(-100:100)={
 0 0 0 0 0 0 0 0 0 0 0 0 0              [-100:-89] subch#1
-1 0 -1 0 -1 0 +1 0 -1 0 +1 0 +1        [- 88:-76] subch#2
 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 75:-64] subch#3
 0 0 0 0 0 0 0 0 0 0 0 0 0 0            [- 63:-51] subch#4
 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 50:-39] subch#1
-1 0 +1 0 -1 0 -1 0 +1 0 -1 0 -1        [- 38:-26] subch#2
 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 25:-14] subch#3
 0 0 0 0 0 0 0 0 0 0 0 0 0 0            [- 13:- 1] subch#4
 0                                      [DC]
```

```
        0 0 0 0 0 0 0 0 0 0 0 0 0          [  1: 13] subch#1
       +1 0 -1 0 -1 0 +1 0 +1 0 +1 0       [ 14: 25] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0          [ 26: 38] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0          [ 39: 50] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0          [ 51: 63] subch#1
       +1 0 -1 0 +1 0 +1 0 +1 0 -1 0       [ 64: 75] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0          [ 76: 88] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0          [ 89:100] subch#4
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

5. The method of claim 1, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #2 which is a second subchannel among the 4 subchannels, then the given sequence is P212subch(-100:100) given by

```
P212subch(-100:100)={
        0 0 0 0 0 0 0 0 0 0 0 0 0          [-100:-89] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0          [- 88:-76] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0          [- 75:-64] subch#4
        0 -1 0 +1 0 -1 0 +1 0 -1 0 +1 0    [- 63:-51] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0          [- 50:-39] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0          [- 38:-26] subch#3
        0 -1 0 -1 0 +1 0 +1 0 +1 0 +1      [- 25:-14] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0          [- 13:- 1] subch#4
        0                                  [DC]
        0 0 0 0 0 0 0 0 0 0 0 0 0          [  1: 13] subch#1
```

```
0 0 0 0 0 0 0 0 0 0 0 0 0                [ 14: 25] subch#3
-1 0 +1 0 -1 0 -1 0 +1 0 -1 0 -1         [ 26: 38] subch#2
0 0 0 0 0 0 0 0 0 0 0 0 0                [ 39: 50] subch#4
0 0 0 0 0 0 0 0 0 0 0 0 0 0              [ 51: 63] subch#3
0 0 0 0 0 0 0 0 0 0 0 0 0                [ 64: 75] subch#1
0 0 0 0 0 0 0 0 0 0 0 0 0                [ 76: 88] subch#4
0 +1 0 +1 0 -1 0 -1 0 +1 0 +1            [ 89:100] subch#2
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

6. The method of claim 1, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #3 which is a third subchannel among the 4 subchannels, then the given sequence is P113subch(-100:100) given by

```
P113subch(-100:100)={
0 0 0 0 0 0 0 0 0 0 0 0 0                [-100:-89] subch#1
0 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 88:-76] subch#2
0 -1 0 -1 0 +1 0 -1 0 -1 0 -1            [- 75:-64] subch#3
0 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 63:-51] subch#4
0 0 0 0 0 0 0 0 0 0 0 0 0                [- 50:-39] subch#1
0 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 38:-26] subch#2
0 -1 0 +1 0 -1 0 -1 0 +1 0 +1            [- 25:-14] subch#3
0 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 13:- 1] subch#4
0                                        [DC]
0 0 0 0 0 0 0 0 0 0 0 0 0                [  1: 13] subch#1
0 0 0 0 0 0 0 0 0 0 0 0 0                [ 14: 25] subch#2
```

```
-1 0 +1 0 +1 0 +1 0 -1 0 -1 0 -1        [  26: 38] subch#3
 0 0 0 0 0 0 0 0 0 0 0 0 0              [  39: 50] subch#4
 0 0 0 0 0 0 0 0 0 0 0 0 0 0            [  51: 63] subch#1
 0 0 0 0 0 0 0 0 0 0 0 0 0              [  64: 75] subch#2
-1 0 +1 0 +1 0 +1 0 +1 0 -1 0 +1        [  76: 88] subch#3
 0 0 0 0 0 0 0 0 0 0 0 0 0              [  89:100] subch#4
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

7. The method of claim 1, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #3 which is a third subchannel among the 4 subchannels, then the given sequence is P213subch(-100:100) given by

```
P213subch(-100:100)={
-1 0 -1 0 +1 0 +1 0 -1 0 -1 0          [-100:-89] subch#3
 0 0 0 0 0 0 0 0 0 0 0 0 0 0           [- 88:-76] subch#1
 0 0 0 0 0 0 0 0 0 0 0 0 0             [- 75:-64] subch#4
 0 0 0 0 0 0 0 0 0 0 0 0 0             [- 63:-51] subch#2
 0 0 0 0 0 0 0 0 0 0 0 0 0             [- 50:-39] subch#1
+1 0 +1 0 -1 0 +1 0 +1 0 -1 0 +1       [- 38:-26] subch#3
 0 0 0 0 0 0 0 0 0 0 0 0 0             [- 25:-14] subch#2
 0 0 0 0 0 0 0 0 0 0 0 0 0             [- 13:- 1] subch#4
 0                                     [DC]
 0 0 0 0 0 0 0 0 0 0 0 0 0             [   1: 13] subch#1
-1 0 -1 0 -1 0 -1 0 +1 0 +1 0          [  14: 25] subch#3
 0 0 0 0 0 0 0 0 0 0 0 0 0             [  26: 38] subch#2
```

```
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [  39: 50] subch#4
        0 -1 0 +1 0 -1 0 +1 0 -1 0 +1 0      [  51: 63] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0            [  64: 75] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0            [  76: 88] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0            [  89:100] subch#2
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

8. The method of claim 1, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #4 which is a fourth subchannel among the 4 subchannels, then the given sequence is P114subch(-100:100) given by

```
P114subch(-100:100)={
        0 0 0 0 0 0 0 0 0 0 0 0 0            [-100:-89] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 88:-76] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0            [- 75:-64] subch#3
        0 -1 0 +1 0 +1 0 -1 0 -1 0 -1 0      [- 63:-51] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0            [- 50:-39] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 38:-26] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0            [- 25:-14] subch#3
        0 +1 0 +1 0 +1 0 -1 0 +1 0 -1 0      [- 13:- 1] subch#4
        0                                    [DC]
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [   1: 13] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0            [  14: 25] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0            [  26: 38] subch#3
        0 +1 0 -1 0 +1 0 +1 0 -1 0 -1        [  39: 50] subch#4
```

```
0 0 0 0 0 0 0 0 0 0 0 0 0          [ 51: 63] subch#1
0 0 0 0 0 0 0 0 0 0 0 0            [ 64: 75] subch#2
0 0 0 0 0 0 0 0 0 0 0 0 0          [ 76: 88] subch#3
0 -1 0 -1 0 -1 0 -1 0 +1 0 -1      [ 89:100] subch#4
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

9. The method of claim 1, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #4 which is a fourth subchannel among the 4 subchannels, then the given sequence is P214subch(-100:100) given by

```
P214subch(-100:100)={
        0 0 0 0 0 0 0 0 0 0 0 0 0      [-100:-89] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0      [- 88:-76] subch#1
        0 -1 0 -1 0 -1 0 -1 0 +1 0 +1  [- 75:-64] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0      [- 63:-51] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0      [- 50:-39] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0      [- 38:-26] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0      [- 25:-14] subch#2
        0 +1 0 -1 0 +1 0 -1 0 +1 0 -1 0 [- 13:- 1] subch#4
        0                              [DC]
        0 0 0 0 0 0 0 0 0 0 0 0 0      [  1: 13] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0      [ 14: 25] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0      [ 26: 38] subch#2
        0 +1 0 +1 0 -1 0 +1 0 +1 0 -1  [ 39: 50] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0      [ 51: 63] subch#3
```

```
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [  64: 75] subch#1
        +1 0 +1 0 +1 0 +1 0 -1 0 -1 0 +1    [  76: 88] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0           [  89:100] subch#2
    }*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

10. The method of claim 1, wherein if m=256, p=4, the number of the selected subchannels is 2, the selected two subchannel are a subchannel #1 which is a first subchannel and a subchannel #3 which is a third subchannel among the 4 subchannels, then the given sequence is P12(1+3)subch(-100:100) given by

```
P12(1+3)subch(-100:100)={
        -1 0 +1 0 +1 0 -1 0 +1 0 -1 0        [-100:-89] subch#1+subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 88:-76] subch#2+subch#4
        0 -1 0 +1 0 +1 0 +1 0 +1 0 +1        [- 75:-64] subch#1+subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 63:-51] subch#2+subch#4
        +1 0 +1 0 +1 0 -1 0 -1 0 -1 0        [- 50:-39] subch#1+subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 38:-26] subch#2+subch#4
        0 -1 0 +1 0 -1 0 -1 0 -1 0 -1        [- 25:-14] subch#1+subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 13:- 1] subch#2+subch#4
        0                                    [DC]
        0 +1 0 +1 0 +1 0 -1 0 +1 0 +1 0      [   1: 13] subch#1+subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [  14: 25] subch#2+subch#4
        -1 0 +1 0 +1 0 -1 0 +1 0 +1 0 -1     [  26: 38] subch#1+subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [  39: 50] subch#2+subch#4
        0 +1 0 +1 0 -1 0 +1 0 -1 0 +1 0      [  51: 63] subch#1+subch#3
```

```
0 0 0 0 0 0 0 0 0 0 0 0                    [  64: 75] subch#2+subch#4

-1 0 -1 0 -1 0 +1 0 -1 0 -1 0 -1           [  76: 88] subch#1+subch#3

0 0 0 0 0 0 0 0 0 0 0 0                    [  89:100] subch#2+subch#4

}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

11. The method of claim 1, wherein if m=256, p=4, the number of the selected subchannels is 2, the selected two subchannel are a subchannel #1 which is a first subchannel and a subchannel #2 which is a second subchannel among the 4 subchannels, then the given sequence is P22(1+2)subch(-100:100) given by

```
P22(1+2)subch(-100:100)={

0 0 0 0 0 0 0 0 0 0 0 0 0                  [-100:-89] subch#3+subch#4

+1 0 +1 0 +1 0 +1 0 -1 0 -1 0 -1           [- 88:-76] subch#1+subch#2

0 0 0 0 0 0 0 0 0 0 0 0 0                  [- 75:-64] subch#3+subch#4

0 +1 0 -1 0 +1 0 +1 0 +1 0 +1 0            [- 63:-51] subch#1+subch#2

0 0 0 0 0 0 0 0 0 0 0 0 0                  [- 50:-39] subch#3+subch#4

-1 0 +1 0 -1 0 +1 0 +1 0 +1 0 +1           [- 38:-26] subch#1+subch#2

0 0 0 0 0 0 0 0 0 0 0 0 0                  [- 25:-14] subch#3+subch#4

0 -1 0 +1 0 +1 0 -1 0 -1 0 -1 0            [- 13:- 1] subch#1+subch#2

0                                          [DC]

0 +1 0 -1 0 -1 0 +1 0 +1 0 +1 0            [   1: 13] subch#1+subch#2

0 0 0 0 0 0 0 0 0 0 0 0 0                  [  14: 25] subch#3+subch#4

-1 0 +1 0 +1 0 -1 0 -1 0 +1 0 -1           [  26: 38] subch#1+subch#2

0 0 0 0 0 0 0 0 0 0 0 0 0                  [  39: 50] subch#3+subch#4

0 +1 0 -1 0 +1 0 +1 0 +1 0 +1 0            [  51: 63] subch#1+subch#2
```

```
0 0 0 0 0 0 0 0 0 0 0 0 0                [  64: 75] subch#3+subch#4
-1 0 -1 0 -1 0 +1 0 +1 0 -1 0 +1         [  76: 88] subch#1+subch#2
0 0 0 0 0 0 0 0 0 0 0 0 0                [  89:100] subch#3+subch#4
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

12. The method of claim 1, wherein if m=256, p=4, the number of the selected subchannels is 2, the selected two subchannel are a subchannel #2 which is a second subchannel and a subchannel #4 which is a fourth subchannel among the 4 subchannels, then the given sequence is P12(2+4)subch(-100:100) given by

```
P12(2+4)subch(-100:100)={
        0 0 0 0 0 0 0 0 0 0 0 0 0        [-100:-89] subch#1+subch#3
        -1 0 -1 0 +1 0 -1 0 +1 0 -1 0 +1 [- 88:-76] subch#2+subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0        [- 75:-64] subch#1+subch#3
        0 -1 0 +1 0 -1 0 +1 0 +1 0 -1 0  [- 63:-51] subch#2+subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0        [- 50:-39] subch#1+subch#3
        -1 0 -1 0 +1 0 +1 0 -1 0 +1 0 -1 [- 38:-26] subch#2+subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0        [- 25:-14] subch#1+subch#3
        0 -1 0 +1 0 -1 0 +1 0 +1 0 -1 0  [- 13:- 1] subch#2+subch#4
        0                                [DC]
        0 0 0 0 0 0 0 0 0 0 0 0 0 0      [   1: 13] subch#1+subch#3
        +1 0 +1 0 +1 0 -1 0 +1 0 +1 0    [  14: 25] subch#2+subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0      [  26: 38] subch#1+subch#3
        0 +1 0 +1 0 -1 0 -1 0 +1 0 +1    [  39: 50] subch#2+subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0      [  51: 63] subch#1+subch#3
```

```
        -1 0 -1 0 -1 0 -1 0 +1 0 -1 0          [  64: 75] subch#2+subch#4

        0 0 0 0 0 0 0 0 0 0 0 0 0              [  76: 88] subch#1+subch#3

        0 +1 0 +1 0 +1 0 -1 0 -1 0 -1          [  89:100] subch#2+subch#4

}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

13. The method of claim 1, wherein if m=256, p=4, the number of the selected subchannels is 2, the selected two subchannel are a subchannel #3 which is a third subchannel and a subchannel #4 which is a fourth subchannel among the 4 subchannels, then the given sequence is P22(3+4)subch(-100:100) given by

```
P22(3+4)subch(-100:100)={

        +1 0 -1 0 +1 0 +1 0 -1 0 +1 0          [-100:-89] subch#3+subch#4

        0 0 0 0 0 0 0 0 0 0 0 0 0              [- 88:-76] subch#1+subch#2

        0 +1 0 +1 0 +1 0 -1 0 +1 0 +1          [- 75:-64] subch#3+subch#4

        0 0 0 0 0 0 0 0 0 0 0 0 0              [- 63:-51] subch#1+subch#2

        +1 0 -1 0 +1 0 +1 0 -1 0 +1 0          [- 50:-39] subch#3+subch#4

        0 0 0 0 0 0 0 0 0 0 0 0 0              [- 38:-26] subch#1+subch#2

        0 -1 0 +1 0 -1 0 +1 0 -1 0 +1          [- 25:-14] subch#3+subch#4

        0 0 0 0 0 0 0 0 0 0 0 0 0              [- 13:- 1] subch#1+subch#2

        0                                      [DC]

        0 0 0 0 0 0 0 0 0 0 0 0 0              [   1: 13] subch#1+subch#2

        -1 0 +1 0 -1 0 -1 0 -1 0 +1 0          [  14: 25] subch#3+subch#4

        0 0 0 0 0 0 0 0 0 0 0 0 0              [  26: 38] subch#1+subch#2

        0 +1 0 +1 0 +1 0 -1 0 -1 0 -1          [  39: 50] subch#3+subch#4

        0 0 0 0 0 0 0 0 0 0 0 0 0              [  51: 63] subch#1+subch#2
```

```
-1 0 +1 0 -1 0 -1 0 -1 0 +1 0          [  64: 75] subch#3+subch#4

0 0 0 0 0 0 0 0 0 0 0 0                [  76: 88] subch#1+subch#2

0 +1 0 -1 0 -1 0 +1 0 +1 0 +1          [  89:100] subch#3+subch#4

}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

14. The method of claim 1, wherein all of the subcarriers except the n subcarriers assigned to the subchannels are subcarriers corresponding to an interference-removed component between a DC component and the subcarriers.

15. An apparatus for generating a preamble sequence in an orthogonal frequency division multiplexing (OFDM) communication system having m subcarriers in a frequency domain, comprising:

a preamble sequence generator for generating the preamble sequence so that data of a given preamble sequence is assigned to at least one subchannel selected from p subchannels generated by grouping the m subcarriers by n subcarriers, where n is less than m, and null data is assigned to subchannels not selected from the p subchannels; and

an inverse fast Fourier transformer (IFFT) for receiving the preamble sequence, assigning null data to subcarriers except the n subcarriers assigned to the subchannels, and thereafter performing inverse fast Fourier transform for transforming the data into time-domain data.

16. The apparatus of claim 15, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #1 which is a first subchannel among the 4 subchannels, then the given sequence is P111subch(-100:100) given by

```
P111subch(-100:100)={

-1 0 +1 0 +1 0 -1 0 -1 0 -1 0          [-100:-89] subch#1
```

```
        0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 88:-76] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 75:-64] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0      [- 63:-51] subch#4
       +1 0 +1 0 +1 0 -1 0 +1 0 -1 0             [- 50:-39] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0      [- 38:-26] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 25:-14] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0      [- 13:- 1] subch#4
        0                                        [DC]
        0 +1 0 -1 0 +1 0 +1 0 -1 0 -1 0          [  1: 13] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0 0              [ 14: 25] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0      [ 26: 38] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0      [ 39: 50] subch#4
        0 -1 0 -1 0 -1 0 -1 0 +1 0 -1 0          [ 51: 63] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0 0              [ 64: 75] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0      [ 76: 88] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0      [ 89:100] subch#4
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

17. The apparatus of claim 15, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #1 which is a first subchannel among the 4 subchannels, then the given sequence is P211subch(-100:100) given by

```
P211subch(-100:100)={
        0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0      [-100:-89] subch#3
```

```
        -1 0 +1 0 +1 0 -1 0 -1 0 -1 0 -1        [- 88:-76] subch#1
         0 0 0 0 0 0 0 0 0 0 0 0 0              [- 75:-64] subch#4
         0 0 0 0 0 0 0 0 0 0 0 0 0 0            [- 63:-51] subch#2
        +1 0 -1 0 -1 0 +1 0 -1 0 -1 0           [- 50:-39] subch#1
         0 0 0 0 0 0 0 0 0 0 0 0 0 0            [- 38:-26] subch#3
         0 0 0 0 0 0 0 0 0 0 0 0 0              [- 25:-14] subch#2
         0 0 0 0 0 0 0 0 0 0 0 0 0 0            [- 13:- 1] subch#4
         0                                      [DC]
         0 +1 0 -1 0 +1 0 -1 0 +1 0 -1 0        [  1: 13] subch#1
         0 0 0 0 0 0 0 0 0 0 0 0 0              [ 14: 25] subch#3
         0 0 0 0 0 0 0 0 0 0 0 0 0 0            [ 26: 38] subch#2
         0 0 0 0 0 0 0 0 0 0 0 0 0              [ 39: 50] subch#4
         0 0 0 0 0 0 0 0 0 0 0 0 0 0            [ 51: 63] subch#3
        -1 0 -1 0 +1 0 +1 0 +1 0 +1 0           [ 64: 75] subch#1
         0 0 0 0 0 0 0 0 0 0 0 0 0              [ 76: 88] subch#4
         0 0 0 0 0 0 0 0 0 0 0 0 0 0            [ 89:100] subch#2
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

18. The apparatus of claim 15, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #2 which is a second subchannel among the 4 subchannels, then the given sequence is P112subch(-100:100) given by

```
P112subch(-100:100)={
         0 0 0 0 0 0 0 0 0 0 0 0 0              [-100:-89] subch#1
```

```
-1 0 -1 0 -1 0 +1 0 -1 0 +1 0 +1        [- 88:-76] subch#2
 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 75:-64] subch#3
 0 0 0 0 0 0 0 0 0 0 0 0 0 0            [- 63:-51] subch#4
 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 50:-39] subch#1
-1 0 +1 0 -1 0 -1 0 +1 0 -1 0 -1        [- 38:-26] subch#2
 0 0 0 0 0 0 0 0 0 0 0 0 0              [- 25:-14] subch#3
 0 0 0 0 0 0 0 0 0 0 0 0 0 0            [- 13:- 1] subch#4
 0                                      [DC]
 0 0 0 0 0 0 0 0 0 0 0 0 0              [  1: 13] subch#1
+1 0 -1 0 -1 0 +1 0 +1 0 +1 0           [ 14: 25] subch#2
 0 0 0 0 0 0 0 0 0 0 0 0 0 0            [ 26: 38] subch#3
 0 0 0 0 0 0 0 0 0 0 0 0 0              [ 39: 50] subch#4
 0 0 0 0 0 0 0 0 0 0 0 0 0 0            [ 51: 63] subch#1
+1 0 -1 0 +1 0 +1 0 +1 0 -1 0           [ 64: 75] subch#2
 0 0 0 0 0 0 0 0 0 0 0 0 0              [ 76: 88] subch#3
 0 0 0 0 0 0 0 0 0 0 0 0 0 0            [ 89:100] subch#4
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

19. The apparatus of claim 15, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #2 which is a second subchannel among the 4 subchannels, then the given sequence is P212subch(-100:100) given by

```
P212subch(-100:100)={
 0 0 0 0 0 0 0 0 0 0 0 0 0              [-100:-89] subch#3
 0 0 0 0 0 0 0 0 0 0 0 0 0 0            [- 88:-76] subch#1
```

```
0 0 0 0 0 0 0 0 0 0 0 0 0          [- 75:-64] subch#4
0 -1 0 +1 0 -1 0 +1 0 -1 0 +1 0    [- 63:-51] subch#2
0 0 0 0 0 0 0 0 0 0 0 0 0          [- 50:-39] subch#1
0 0 0 0 0 0 0 0 0 0 0 0 0          [- 38:-26] subch#3
0 -1 0 -1 0 +1 0 +1 0 +1 0 +1      [- 25:-14] subch#2
0 0 0 0 0 0 0 0 0 0 0 0 0          [- 13:- 1] subch#4
0                                  [DC]
0 0 0 0 0 0 0 0 0 0 0 0 0          [  1: 13] subch#1
0 0 0 0 0 0 0 0 0 0 0 0 0          [ 14: 25] subch#3
-1 0 +1 0 -1 0 -1 0 +1 0 -1 0 -1   [ 26: 38] subch#2
0 0 0 0 0 0 0 0 0 0 0 0 0          [ 39: 50] subch#4
0 0 0 0 0 0 0 0 0 0 0 0 0          [ 51: 63] subch#3
0 0 0 0 0 0 0 0 0 0 0 0 0          [ 64: 75] subch#1
0 0 0 0 0 0 0 0 0 0 0 0 0          [ 76: 88] subch#4
0 +1 0 +1 0 -1 0 -1 0 +1 0 +1      [ 89:100] subch#2
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

20. The apparatus of claim 15, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #3 which is a third subchannel among the 4 subchannels, then the given sequence is P113subch(-100:100) given by

```
P113subch(-100:100)={
    0 0 0 0 0 0 0 0 0 0 0 0 0      [-100:-89] subch#1
    0 0 0 0 0 0 0 0 0 0 0 0 0      [- 88:-76] subch#2
    0 -1 0 -1 0 +1 0 -1 0 -1 0 -1  [- 75:-64] subch#3
```

```
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 63:-51] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0           [- 50:-39] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0 0         [- 38:-26] subch#2
        0 -1 0 +1 0 -1 0 -1 0 +1 0 +1       [- 25:-14] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0         [- 13:- 1] subch#4
        0                                   [DC]
        0 0 0 0 0 0 0 0 0 0 0 0 0 0         [  1: 13] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0           [ 14: 25] subch#2
        -1 0 +1 0 +1 0 +1 0 -1 0 -1 0 -1    [ 26: 38] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0           [ 39: 50] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0         [ 51: 63] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0           [ 64: 75] subch#2
        -1 0 +1 0 +1 0 +1 0 +1 0 -1 0 +1    [ 76: 88] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0           [ 89:100] subch#4
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

21. The apparatus of claim 15, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #3 which is a third subchannel among the 4 subchannels, then the given sequence is P213subch(-100:100) given by

```
P213subch(-100:100)={
        -1 0 -1 0 +1 0 +1 0 -1 0 -1 0       [-100:-89] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0         [- 88:-76] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0           [- 75:-64] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0         [- 63:-51] subch#2
```

```
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 50:-39] subch#1
        +1 0 +1 0 -1 0 +1 0 +1 0 -1 0 +1    [- 38:-26] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 25:-14] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 13:- 1] subch#4
        0                                    [DC]
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [  1: 13] subch#1
        -1 0 -1 0 -1 0 -1 0 +1 0 +1 0        [ 14: 25] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [ 26: 38] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [ 39: 50] subch#4
        0 -1 0 +1 0 -1 0 +1 0 -1 0 +1 0      [ 51: 63] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [ 64: 75] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [ 76: 88] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [ 89:100] subch#2
    }*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

22. The apparatus of claim 15, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #4 which is a fourth subchannel among the 4 subchannels, then the given sequence is P114subch(-100:100) given by

```
P114subch(-100:100)={
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [-100:-89] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 88:-76] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 75:-64] subch#3
        0 -1 0 +1 0 +1 0 -1 0 -1 0 -1 0      [- 63:-51] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 50:-39] subch#1
```

```
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 38:-26] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0            [- 25:-14] subch#3
        0 +1 0 +1 0 +1 0 -1 0 +1 0 -1 0      [- 13:- 1] subch#4
        0                                    [DC]
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [  1: 13] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0            [ 14: 25] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [ 26: 38] subch#3
        0 +1 0 -1 0 +1 0 +1 0 -1 0 -1        [ 39: 50] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [ 51: 63] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0            [ 64: 75] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [ 76: 88] subch#3
        0 -1 0 -1 0 -1 0 -1 0 +1 0 -1        [ 89:100] subch#4
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

23. The apparatus of claim 15, wherein if m=256, p=4, the number of the selected subchannels is 1, the selected one subchannel is a subchannel #4 which is a fourth subchannel among the 4 subchannels, then the given sequence is P214subch(-100:100) given by

```
P214subch(-100:100)={
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [-100:-89] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0            [- 88:-76] subch#1
        0 -1 0 -1 0 -1 0 -1 0 +1 0 +1        [- 75:-64] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 63:-51] subch#2
        0 0 0 0 0 0 0 0 0 0 0 0 0            [- 50:-39] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 38:-26] subch#3
```

```
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 25:-14] subch#2
        0 +1 0 -1 0 +1 0 -1 0 +1 0 -1 0      [- 13:- 1] subch#4
        0                                    [DC]
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [  1: 13] subch#1
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [ 14: 25] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [ 26: 38] subch#2
        0 +1 0 +1 0 -1 0 +1 0 +1 0 -1        [ 39: 50] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [ 51: 63] subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [ 64: 75] subch#1
        +1 0 +1 0 +1 0 +1 0 -1 0 -1 0 +1     [ 76: 88] subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [ 89:100] subch#2
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

24. The apparatus of claim 15, wherein if m=256, p=4, the number of the selected subchannels is 2, the selected two subchannel are a subchannel #1 which is a first subchannel and a subchannel #3 which is a third subchannel among the 4 subchannels, then the given sequence is P12(1+3)subch(-100:100) given by

```
P12(1+3)subch(-100:100)={
        -1 0 +1 0 +1 0 -1 0 +1 0 -1 0        [-100:-89] subch#1+subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 88:-76] subch#2+subch#4
        0 -1 0 +1 0 +1 0 +1 0 +1 0 +1        [- 75:-64] subch#1+subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 63:-51] subch#2+subch#4
        +1 0 +1 0 +1 0 -1 0 -1 0 -1 0        [- 50:-39] subch#1+subch#3
        0 0 0 0 0 0 0 0 0 0 0 0 0 0          [- 38:-26] subch#2+subch#4
```

```
0 -1 0 +1 0 -1 0 -1 0 -1 0 -1          [- 25:-14] subch#1+subch#3

0 0 0 0 0 0 0 0 0 0 0 0 0              [- 13:- 1] subch#2+subch#4

0                                      [DC]

0 +1 0 +1 0 +1 0 -1 0 +1 0 +1 0        [  1: 13] subch#1+subch#3

0 0 0 0 0 0 0 0 0 0 0 0 0              [ 14: 25] subch#2+subch#4

-1 0 +1 0 +1 0 -1 0 +1 0 +1 0 -1       [ 26: 38] subch#1+subch#3

0 0 0 0 0 0 0 0 0 0 0 0 0              [ 39: 50] subch#2+subch#4

0 +1 0 +1 0 -1 0 +1 0 -1 0 +1 0        [ 51: 63] subch#1+subch#3

0 0 0 0 0 0 0 0 0 0 0 0 0              [ 64: 75] subch#2+subch#4

-1 0 -1 0 -1 0 +1 0 -1 0 -1 0 -1       [ 76: 88] subch#1+subch#3

0 0 0 0 0 0 0 0 0 0 0 0 0              [ 89:100] subch#2+subch#4

}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

25. The apparatus of claim 15, wherein if m=256, p=4, the number of the selected subchannels is 2, the selected two subchannel are a subchannel #1 which is a first subchannel and a subchannel #2 which is a second subchannel among the 4 subchannels, then the given sequence is P22(1+2)subch(-100:100) given by

```
P22(1+2)subch(-100:100)={

0 0 0 0 0 0 0 0 0 0 0 0 0              [-100:-89] subch#3+subch#4

+1 0 +1 0 +1 0 +1 0 -1 0 -1 0 -1       [- 88:-76] subch#1+subch#2

0 0 0 0 0 0 0 0 0 0 0 0 0              [- 75:-64] subch#3+subch#4

0 +1 0 -1 0 +1 0 +1 0 +1 0 +1 0        [- 63:-51] subch#1+subch#2

0 0 0 0 0 0 0 0 0 0 0 0 0              [- 50:-39] subch#3+subch#4

-1 0 +1 0 -1 0 +1 0 +1 0 +1 0 +1       [- 38:-26] subch#1+subch#2
```

```
0 0 0 0 0 0 0 0 0 0 0 0 0                [- 25:-14] subch#3+subch#4
0 -1 0 +1 0 +1 0 -1 0 -1 0 -1 0          [- 13:- 1] subch#1+subch#2
0                                        [DC]
0 +1 0 -1 0 -1 0 +1 0 +1 0 +1 0          [  1: 13] subch#1+subch#2
0 0 0 0 0 0 0 0 0 0 0 0 0                [ 14: 25] subch#3+subch#4
-1 0 +1 0 +1 0 -1 0 -1 0 +1 0 -1         [ 26: 38] subch#1+subch#2
0 0 0 0 0 0 0 0 0 0 0 0 0                [ 39: 50] subch#3+subch#4
0 +1 0 -1 0 +1 0 +1 0 +1 0 +1 0          [ 51: 63] subch#1+subch#2
0 0 0 0 0 0 0 0 0 0 0 0 0                [ 64: 75] subch#3+subch#4
-1 0 -1 0 -1 0 +1 0 +1 0 -1 0 +1         [ 76: 88] subch#1+subch#2
0 0 0 0 0 0 0 0 0 0 0 0 0                [ 89:100] subch#3+subch#4
}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

26. The apparatus of claim 15, wherein if m=256, p=4, the number of the selected subchannels is 2, the selected two subchannel are a subchannel #2 which is a second subchannel and a subchannel #4 which is a fourth subchannel among the 4 subchannels, then the given sequence is P12(2+4)subch(-100:100) given by

```
P12(2+4)subch(-100:100)={
0 0 0 0 0 0 0 0 0 0 0 0 0                [-100:-89] subch#1+subch#3
-1 0 -1 0 +1 0 -1 0 +1 0 -1 0 +1         [- 88:-76] subch#2+subch#4
0 0 0 0 0 0 0 0 0 0 0 0 0                [- 75:-64] subch#1+subch#3
0 -1 0 +1 0 -1 0 +1 0 +1 0 -1 0          [- 63:-51] subch#2+subch#4
0 0 0 0 0 0 0 0 0 0 0 0 0                [- 50:-39] subch#1+subch#3
-1 0 -1 0 +1 0 +1 0 -1 0 +1 0 -1         [- 38:-26] subch#2+subch#4
```

```
        0 0 0 0 0 0 0 0 0 0 0 0 0                [- 25:-14] subch#1+subch#3
        0 -1 0 +1 0 -1 0 +1 0 +1 0 -1 0          [- 13:- 1] subch#2+subch#4
        0                                        [DC]
        0 0 0 0 0 0 0 0 0 0 0 0 0 0              [  1: 13] subch#1+subch#3
        +1 0 +1 0 +1 0 -1 0 +1 0 +1 0            [ 14: 25] subch#2+subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0              [ 26: 38] subch#1+subch#3
        0 +1 0 +1 0 -1 0 -1 0 +1 0 +1            [ 39: 50] subch#2+subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0              [ 51: 63] subch#1+subch#3
        -1 0 -1 0 -1 0 -1 0 +1 0 -1 0            [ 64: 75] subch#2+subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0 0              [ 76: 88] subch#1+subch#3
        0 +1 0 +1 0 +1 0 -1 0 -1 0 -1            [ 89:100] subch#2+subch#4
    }*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

27. The apparatus of claim 15, wherein if m=256, p=4, the number of the selected subchannels is 2, the selected two subchannel are a subchannel #3 which is a third subchannel and a subchannel #4 which is a fourth subchannel among the 4 subchannels, then the given sequence is P22(3+4)subch(-100:100) given by

```
P22(3+4)subch(-100:100)={
        +1 0 -1 0 +1 0 +1 0 -1 0 +1 0            [-100:-89] subch#3+subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0                [- 88:-76] subch#1+subch#2
        0 +1 0 +1 0 +1 0 -1 0 +1 0 +1            [- 75:-64] subch#3+subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0                [- 63:-51] subch#1+subch#2
        +1 0 -1 0 +1 0 +1 0 -1 0 +1 0            [- 50:-39] subch#3+subch#4
        0 0 0 0 0 0 0 0 0 0 0 0 0                [- 38:-26] subch#1+subch#2
```

```
0 -1 0 +1 0 -1 0 +1 0 -1 0 +1          [- 25:-14] subch#3+subch#4

0 0 0 0 0 0 0 0 0 0 0 0                [- 13:- 1] subch#1+subch#2

0                                      [DC]

0 0 0 0 0 0 0 0 0 0 0 0                [  1: 13] subch#1+subch#2

-1 0 +1 0 -1 0 -1 0 -1 0 +1 0          [ 14: 25] subch#3+subch#4

0 0 0 0 0 0 0 0 0 0 0 0                [ 26: 38] subch#1+subch#2

0 +1 0 +1 0 +1 0 -1 0 -1 0 -1          [ 39: 50] subch#3+subch#4

0 0 0 0 0 0 0 0 0 0 0 0                [ 51: 63] subch#1+subch#2

-1 0 +1 0 -1 0 -1 0 -1 0 +1 0          [ 64: 75] subch#3+subch#4

0 0 0 0 0 0 0 0 0 0 0 0                [ 76: 88] subch#1+subch#2

0 +1 0 -1 0 -1 0 +1 0 +1 0 +1          [ 89:100] subch#3+subch#4

}*sqrt(2)*sqrt(2)
```

where $(n_x:n_y)$ represents subcarriers of n_x^{th} to n_y^{th} subcarriers.

28. The apparatus of claim 15, wherein all of the subcarriers except the n subcarriers assigned to the subchannels are subcarriers corresponding to an interference-removed component between a DC component and the subcarriers.